WHAT IS CLAIMED IS:

1.   An objective lens driving apparatus comprising:

an objective lens;

an objective lens holder for holding the objective lens, the objective lens holder being supported to be movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

a focusing coil for driving the objective lens holder in the optical axis direction;

a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

focus control means for receiving a detection signal from the focus detection means and outputting an arithmetic operation result of this detection signal to the focusing coil;

tracking control means for receiving a detection signal from the tracking detection means and outputting an arithmetic operation result of this detection signal

to the tracking coil; and

compensation means for receiving at least one of output signals from the focus control means and the tracking control means, and adding an arithmetic

5 operation result of the received signal to an output signal from the tracking control means to the tracking coil or to an output signal from the focus control means to the focusing coil.

2. An objective lens driving apparatus according

10 to claim 1, wherein the compensation means arithmetically processes the output signal from the tracking control means and adds the arithmetic operation result to the output signal from the focus control means to the focusing coil.

15 3. An objective lens driving apparatus according to claim 1, wherein the compensation means arithmetically processes the output signal from the focus control means and adds the arithmetic operation result to the output signal from the tracking control

20 means to the tracking coil.

4. An objective lens driving apparatus according to claim 1, wherein the compensation means arithmetically processes the output signal from the tracking control means and adds the arithmetic

25 operation result to the output signal from the focus control means to the focusing coil, and the compensation means arithmetically processes the output

signal from the focus control means and adds the
arithmetic operation result to the output signal from
the tracking control means to the tracking coil.

5. An objective lens driving apparatus according
to claim 1, wherein the compensation means performs
arithmetic operations to provide such frequency
characteristics as to pass a frequency component near a
control band determined by the tracking control means
and the focus control means.

6. An objective lens driving apparatus according
to claim 1, further comprising compensation means for
compensating reversion of polarity, when the polarity
of a signal detected by the tracking detection means is
reversed while the objective lens is being tracked to a
desired position.

7. An objective lens driving apparatus
comprising:

an objective lens;

an objective lens holder for holding the objective
lens, the objective lens holder being supported to be
movable in an optical axis direction of a light beam
made incident on the objective lens and a direction
perpendicular to the optical axis direction;

a focusing coil for driving the objective lens
holder in the optical axis direction;

a tracking coil for driving the objective lens
holder in the direction perpendicular to the optical

axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

5   tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

focus control means for receiving a detection signal from the focus detection means and outputting an

10   arithmetic operation result of this detection signal to the focusing coil;

tracking control means for receiving a detection signal from the tracking detection means and outputting an arithmetic operation result of this detection signal

15   to the tracking coil; and

compensation means for receiving at least one of detection signals from the focus detection means and the tracking detection means, and adding an arithmetic operation result of the received detection signal to a

20   tracking error detection signal from the tracking detection means to the tracking control means or to a focus error detection signal from the focus detection means to the focus control means.

8.   An objective lens driving apparatus according

25   to claim 7, wherein the compensation means arithmetically processes the tracking error detection signal from the tracking detection means and adds the

arithmetic operation result to the focus error
detection signal from the focus detection means.

9. An objective lens driving apparatus according
to claim 7, wherein the compensation means

5   arithmetically processes the focus error detection
signal from the focus detection means and adds the
arithmetic operation result to the tracking error
detection signal from the tracking detection means.

10. An objective lens driving apparatus according

10   to claim 7, wherein the compensation means
arithmetically processes the tracking error detection
signal from the tracking detection means and adds the
arithmetic operation result to the focus error
detection signal from the focus detection means, and

15   the compensation means arithmetically processes the
focus error detection signal from the focus detection
means and adds the arithmetic operation result to the
tracking error detection signal from the tracking
detection means.

20   11. An objective lens driving apparatus according
to claim 7, wherein the compensation means performs
arithmetic operations to provide such frequency
characteristics as to pass a frequency component near a
control band determined by the tracking control means

25   and the focus control means.

12. An objective lens driving apparatus according
to claim 7, further comprising compensation means for

compensating reversion of polarity, when the polarity
of a signal detected by the tracking detection means is
reversed while the objective lens is being tracked to a
desired position.

5   13.   An optical disk apparatus comprising:

an objective lens for converging a light beam onto
an optical disk;

an objective lens holder for holding the objective
lens, the objective lens holder being supported to be
10   movable in an optical axis direction of a light beam
made incident on the objective lens and a direction
perpendicular to the optical axis direction;

a focusing coil for driving the objective lens
holder in the optical axis direction;

15   a tracking coil for driving the objective lens
holder in the direction perpendicular to the optical
axis direction;

focus detection means for detecting a positioning
error of the objective lens holder in the optical axis
20   direction;

tracking detection means for detecting a
positioning error of the objective lens holder in the
direction perpendicular to the optical axis direction;

control means for arithmetically processing at
25   least one of detection signals from the focus detection
means and the tracking detection means and outputting a
control signal to each of the focusing coil and the

tracking coil; and

determination means for temporarily restricting functions of the control means when the determination means has determined that a disturbance component is mixed in the detection signal.

14. An optical disk apparatus according to claim 13, wherein the control means comprises:

focus control means for receiving a detection signal from the focus detection means and outputting a focus control signal to the focusing coil;

tracking control means for receiving a detection signal from the tracking detection means and outputting a tracking control signal to the tracking coil; and

compensation means for receiving an output signal from one of the focus control means and the tracking control means, and arithmetically processing the received output signal.

15. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the tracking control signal from the tracking control means and adds the arithmetic operation result to the focus control signal.

16. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the focus control signal from the focus control means and adds the arithmetic operation result to the tracking control signal.

17. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the tracking control signal from the tracking control means and adds the arithmetic operation result to the focus control signal, and the compensation means arithmetically processes the focus control signal from the focus control means and adds the arithmetic operation result to the tracking control signal.

18. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the detection signal from the tracking detection means and adds the arithmetic operation result to the focus control signal.

19. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the detection signal from the focus detection means and adds the arithmetic operation result to the tracking control signal.

20. An optical disk apparatus according to claim 14, wherein the compensation means arithmetically processes the detection signal from the tracking detection means and adds the arithmetic operation result to the focus control signal, and the compensation means arithmetically processes the detection signal from the focus detection means and adds the arithmetic operation result to the tracking control signal.

21. An optical disk apparatus according to claim 14, wherein the compensation means performs arithmetic operations to provide such frequency characteristics as to pass a frequency component near a
5   control band determined by the focus control means and the tracking control means.

22. An optical disk apparatus according to claim 14, further comprising change-over switch means for switching an arithmetic processing method in the
10   compensation means in accordance with a tracking control state.

23. An optical disk apparatus according to claim 22, wherein the change-over switch means corrects reversion of polarity, when the polarity of a detection
15   signal detected by the tracking detection means is reversed while the objective lens is being tracked to a desired position.

24. An optical disk apparatus according to claim 13, wherein the determination means determines a
20   header signal and a jump signal to be disturbance components.

25. An optical disk apparatus according to claim 14, wherein the determination means temporarily restricts functions of the compensation means when the
25   determination means has determined that a disturbance component is mixed in the detection signal obtained by the tracking detection means.

26. An optical disk apparatus according to claim 14, wherein the determination means temporarily restricts functions of the compensation means when the determination means has determined a tracking control

5   error on the basis of a disturbance component mixed in the detection signal obtained by the tracking detection means.

27. An optical disk apparatus according to claim 13, wherein the control means comprises:

10   focus control means for arithmetically processing the detection signal from the focus detection means and outputting a focus control signal to the focusing coil;

    tracking control means for arithmetically processing the detection signal from the tracking

15   detection means and outputting a tracking control signal to the tracking coil; and

    compensation means for receiving at least one of the detection signals from the focus detection means and the tracking detection means, and adding an

20   arithmetic operation result of the received detection signal to a tracking error detection signal from the tracking detection means to the tracking control means or to a focus error detection signal from the focus detection means to the focus control means.

25   28. An optical disk apparatus comprising:

    an objective lens for converging a light beam onto an optical disk having information

recordable/reproducible land tracks and groove tracks;

an objective lens holder for holding the objective lens, the objective lens holder being supported to be movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

a focusing coil for driving the objective lens holder in the optical axis direction;

a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

control means for arithmetically processing at least one of detection signals from the focus detection means and the tracking detection means and outputting a control signal to each of the focusing coil and the tracking coil;

disturbance generating means for generating a disturbance component of a predetermined frequency and adding the disturbance component to the detection signal; and

phase difference detection means for detecting a

phase difference between a phase of a response signal

corresponding to the detection signal, to which the

disturbance component has been added, and a phase of

the added disturbance component, in each of cases where

5   the land tracks are being subjected to a tracking

control and the groove tracks are being subjected to

the tracking control.

29. An optical disk apparatus according to

claim 28, wherein the phase difference detection means

10   sets parameters for arithmetic operations in the

control means such that a difference value between the

phase difference in the case where the land tracks are

being subjected to the tracking control and the phase

difference in the case where the groove tracks are

15   being subjected to the tracking control may become a

predetermined value or less.

30. An optical disk apparatus comprising:

an objective lens for converging a light beam onto

an optical disk;

20   an objective lens holder for holding the objective

lens, the objective lens holder being supported to be

movable in an optical axis direction of a light beam

made incident on the objective lens and a direction

perpendicular to the optical axis direction;

25   a focusing coil for driving the objective lens

holder in the optical axis direction;

a tracking coil for driving the objective lens

holder in the direction perpendicular to the optical
axis direction;

focus detection means for detecting a positioning
error of the objective lens holder in the optical axis
5   direction;

tracking detection means for detecting a
positioning error of the objective lens holder in the
direction perpendicular to the optical axis direction;

focus control means for arithmetically processing
10   a detection signal from the focus detection means and
outputting a focus control signal to the focusing coil;

tracking control means for arithmetically
processing a detection signal from the tracking
detection means and outputting a tracking control
15   signal to the tracking coil;

compensation means for arithmetically processing
the tracking control signal from the tracking control
means on the basis of a predetermined compensation
coefficient, and adding the arithmetic operation result
20   to the focus control signal;

disturbance generating means for generating a
disturbance component of a predetermined frequency and
adding the disturbance component to the detection
signal obtained by the tracking detection means;

25   gain comparison means for comparing an amplitude
of the output signal from the tracking detection means
and an amplitude of the disturbance component generated

by the disturbance generating means; and

adjustment means for adjusting the compensation coefficient for the arithmetic operation in the compensation means in accordance with a comparison result of the gain comparison means.

31. An optical disk apparatus comprising:

an objective lens for converging a light beam onto an optical disk;

an objective lens holder for holding the objective lens, the objective lens holder being supported to be movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

a focusing coil for driving the objective lens holder in the optical axis direction;

a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

focus control means for arithmetically processing a detection signal from the focus detection means and outputting a focus control signal to the focusing coil;

tracking control means for arithmetically
processing a detection signal from the tracking
detection means and outputting a tracking control
signal to the tracking coil;

5   compensation means for arithmetically processing
the tracking control signal from the tracking control
means on the basis of a predetermined compensation
coefficient, and adding the arithmetic operation result
to the focus control signal;

10   disturbance generating means for generating a
disturbance component of a predetermined frequency and
adding the disturbance component to the detection
signal obtained by the tracking detection means;

        phase comparison means for comparing a phase of
15   the output signal from the tracking detection means and
a phase of the disturbance component generated by the
disturbance generating means; and

        adjustment means for adjusting the compensation
coefficient for the arithmetic operation in the
20   compensation means in accordance with a comparison
result of the phase comparison means.

        32. An adjustment method for an optical disk
apparatus comprising:

        an objective lens for converging a light beam onto
25   an optical disk having information
recordable/reproducible land tracks and groove tracks;

        an objective lens holder for holding the objective

lens, the objective lens holder being supported to be movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

5   a focusing coil for driving the objective lens holder in the optical axis direction;

a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

10   focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

15   and

control means for arithmetically processing at least one of detection signals from the focus detection means and the tracking detection means and outputting a

20   control signal to each of the focusing coil and the tracking coil,

the method comprising:

generating a disturbance component of a predetermined frequency;

25   adding the disturbance component to the detection signal;

detecting a phase difference between a phase of a

response signal corresponding to the detection signal, to which the disturbance component has been added, and a phase of the added disturbance component, in each of cases where the land tracks are being subjected to a

5 tracking control and the groove tracks are being subjected to the tracking control; and

setting parameters for arithmetic operations in the control means such that a difference value between the phase difference in the case where the land tracks

10 are being subjected to the tracking control and the phase difference in the case where the groove tracks are being subjected to the tracking control may become a predetermined value or less.

33. An adjustment method for an optical disk

15 apparatus comprising:

an objective lens for converging a light beam onto an optical disk;

an objective lens holder for holding the objective lens, the objective lens holder being supported to be

20 movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

a focusing coil for driving the objective lens holder in the optical axis direction;

25 a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

focus control means for arithmetically processing a detection signal from the focus detection means and outputting a focus control signal to the focusing coil;

tracking control means for arithmetically processing a detection signal from the tracking detection means and outputting a tracking control signal to the tracking coil; and

compensation means for arithmetically processing the tracking control signal from the tracking control means on the basis of a predetermined compensation coefficient, and adding the arithmetic operation result to the focus control signal,

the method comprising:

generating a disturbance component of a predetermined frequency;

adding the disturbance component to the detection signal obtained by the tracking detection means;

comparing an amplitude of the output signal from the tracking detection means and an amplitude of the disturbance component generated by the disturbance generating means; and

adjusting the compensation coefficient for the arithmetic operation in the compensation means in accordance with the comparison result.

34. An adjustment method for an optical disk apparatus comprising:

an objective lens for converging a light beam onto an optical disk;

an objective lens holder for holding the objective lens, the objective lens holder being supported to be movable in an optical axis direction of a light beam made incident on the objective lens and a direction perpendicular to the optical axis direction;

a focusing coil for driving the objective lens holder in the optical axis direction;

a tracking coil for driving the objective lens holder in the direction perpendicular to the optical axis direction;

focus detection means for detecting a positioning error of the objective lens holder in the optical axis direction;

tracking detection means for detecting a positioning error of the objective lens holder in the direction perpendicular to the optical axis direction;

focus control means for arithmetically processing a detection signal from the focus detection means and outputting a focus control signal to the focusing coil;

tracking control means for arithmetically

processing a detection signal from the tracking

detection means and outputting a tracking control

signal to the tracking coil; and

compensation means for arithmetically processing

5   the tracking control signal from the tracking control

means on the basis of a predetermined compensation

coefficient, and adding the arithmetic operation result

to the focus control signal,

the method comprising:

10   generating a disturbance component of a

predetermined frequency;

adding the disturbance component to the detection

signal obtained by the tracking detection means;

comparing a phase of the output signal from the

15   tracking detection means and a phase of the disturbance

component generated by the disturbance generating

means; and

adjusting the compensation coefficient for the

arithmetic operation in the compensation means in

20   accordance with the comparison result.